A FISH AND WILDLIFE PLAN FOR BOLINAS LAGOON, MARIN COUNTY

Region 3
California Department of Fish and Game

INTRODUCTION

California's coastline is endowed with a dozen or more estuaries of major importance throughout its entire length. These waters, due to their beauty and productivity, have characteristically been a focal point of human activity since earliest times. Today, under our expanding population, their uses are becoming greater and more varied.

Not all of these uses are compatible with one another. It has become evident that without guidance in orderly development and use of such estuaries, these fragile ecological areas may be lost.

San Francisco Bay approached an uncertain fate prior to recent action by a concerned public, who did not wish to see piecemeal development destroy one of the most valuable estuaries in the State. With the recent formation of the Bay Conservation Development Commission, orderly development under a carefully prepared master plan will be considered.

Bolinas Lagoon appears to be going through the same evolutionary process. Public support is developing to safeguard and protect the major beneficial uses of the Lagoon.

The purpose of this report is to summarize information on the fish and wildlife resources of Bolinas Lagoon and their use by the people. It is hoped such information will be helpful in guiding those who will ultimately be making the decisions concerning the Lagoon's future.

Description

Bolinas Lagoon is a comparatively small estuary located on the coast of Marin County about twelve miles north of the Golden Gate. It is a triangular-shaped shallow body of water about two miles long and one and one-half miles wide. This represents a surface area of approximately 1,400 acres. About two-thirds of this area is exposed during low tide.

The Lagoon receives the surface drainage of about 15 square miles, mainly from the north and west, where several small streams enter.

Of the 1,400 acres in the Lagoon, about 290 acres are privately owned and 1,110 acres are publicly owned and under the jurisdiction of the Bolinas Harbor District. These lands were conveyed to the District by the Legislature in 1957. The small towns of Bolinas and Stinson Beach lie to the west and east of the Lagoon. About one and one-half miles of the eight miles of shoreline bordering the Lagoon are publicly owned. Public access is, however, presently permitted at many locations.

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Biologically, the Lagoon is high in productivity, supporting many forms of marine life including shellfish. Such richness attracts large numbers of shorebirds and waterfowl, as well as fishlife to the area. These uses will be described in detail in later sections.

There are many beneficial uses of the Lagoon which bear recognition. Chief among these are its aesthetic beauty and recreational uses. Activities include sightseeing, boating, fishing, clamming, picnicking and some swimming and waterfowl hunting. A marine biological laboratory is also established on its margin by the College of Marin. In addition to the fish and wildlife uses mentioned, there is current interest in the establishment of a small craft harbor.

A master plan has been developed by Marin County. (This needs modification and updating, however.) A separate plan is being developed by the Bolinas Harbor District. Private landowners have shown considerable interest and concern with the residential and commercial development of lagoon and shore properties. They are very much interested in a proposed plan of development for this area. There is an existing need for coordination of the planning effort.

There are many small streams which drain directly into the Lagoon, especially from the northern and eastern sections of the watershed. In some cases, moderate to heavy discharges of soil erosion products are being deposited in the Lagoon. Studies conducted through the cooperation of the Marin County Soil Conservation District, could define the critical erosion areas of the water shed and implement corrective action. The dumping of debris into the marginal tidelands is an observed practice which should be eliminated.

FISHERY RESOURCES

Description

The Lagoon consists of a shallow basin connected to the ocean by a narrow channel. Tidal action greatly affects the area accessible to both fish and anglers. At low tide, most of the Lagoon becomes an exposed mud flat with limited permanent water channels.

Species Present

Marine fishes include rubberlip perch, shiner perch, redtail perch, silver perch, smelt, anchovy, leopard shark, and sting ray.

Anadromous fishes which enter the lagoon include silver salmon and steelhead. They run up Bolinas Creek and other small tributaries to spawn. Striped bass also enter the lagoon.

Human Use

From July through October, when stripers are running, the area receives heavy angling use. The striper fishery is concentrated in the deep water area around the mouth of the channel. Although boats are used in this area, most of the angling is done from shore.

The presence of schools of anchovies is related to the numbers of stripers which forage in the lagoon. Concurrent runs of anchovies and striped bass produce good fishing which attracts many anglers. The Bolinas Rod and Boat Club conducts an annual striper derby.

The perch fishery is comparatively small, with 10-20 anglers fishing specifically for them over a good weekend.

Over-all Importance

The fishery resources are subordinate to the shell fish resources in providing recreation and use of the lagoon.

Development of the lagoon by dredging is unlikely to have any adverse effect on the fishery resources. However, the building of breakwaters and jetties would provide additional access for shore anglers and enhance the area for their use.

Recommendations

Harbor developments in the form of breakwater and jetties would increase the limited area available to shore fishermen. These developments should be made safe and accessible to anglers. Public boat launching facilities should also be provided.

SHELLFISH RESOURCES

Description of the Environment

The lagoon is an ideal environment for a variety of shellfish. This is no doubt due to the abundance of nutrients developed by the mud flats through alternate exposure and flooding. Nutrients are circulated throughout the lagoon by tidal action. Relatively warm shallow water in such a protected area makes ideal growing conditions. In fact, it is stated by commercial oyster growers who formerly operated in the Lagoon that "Oysters grow faster here than in any other lagoon in California". There are still remnants of a former commercial oyster bed in the mid-section of the lagoon. Due to contamination from sewage discharges, the Coast Oyster Company was forced to suspend operations.

Shellfish Resources Present

There is a considerable sport shellfish resource in the lagoon. The most desirable clams present in abundant supply are Gapers, Washingtons and Littlenecks. (See Appendix III). Historically, digging for clams has been excellent.

Based on aerial and ground surveys, our Department estimates that over 7,000 people harvested shellfish from Bolinas Lagoon during 1963. Eighty percent were non-residents who visited the area on weekends.

Management of Shellfish Resources

Most deep water areas of Bolinas Lagoon, as well as shallow intertidal mud flats, contain shellfish. Only those sections of the lagoon near fresh water inflow do not have shellfish (See Appendix III).

Dredging may not inflict permanent injury to the shellfish. Areas of the lagoon deepened by dredging for boat channels or turning basins would probably still be suitable shellfish habitat. They would be reseeded by spawn of shellfish in adjacent areas within a short time. However, such areas would no longer be exposed at low tide and no shellfish could be harvested. In addition, the use of dredged spoil as fill material within the lagoon would adversely affect the shellfish resource.

In summary, the shoreline of Bolinas Lagoon can be altered without permanent harm to the shellfish resources as long as the following criteria are met:

1. Preservation of existing tidal flushing.
2. Maintenance of the existing acreage of water area.
3. Maintenance of the shallow intertidal mud flat area. These flats could be relocated or rearranged without permanent harm.
4. Protection of water quality.

Status of Waste Discharges into Bolinas Lagoon

There have been considerable controversies over whether or not the shellfish in the lagoon are safe for human consumption in view of known sewage discharges. It is our contention that for many reasons, including public health purposes, all harmful waste discharges into the lagoon should be eliminated.

The Regional Water Quality Control Board recently adopted (December, 1964) a long-range plan and policy for the Bolinas-Stinson Beach area. Included was a prohibition against any discharge of sewage (treated or untreated) into Bolinas Lagoon or its tributaries (including the channel between Bolinas Lagoon and Bolinas Bay). Any other substances that would interfere with propogation and harvest of shellfish are also prohibited.

The Bolinas Public Utility District currently discharges about 40,000 gallons per day of sewage into the Lagoon. However, the entire Bolinas-Stinson Beach area is now being studied for combined waste treatment and disposal facilities plans. This study is being carried out cooperatively by Marin County, Bolinas Public Utility District and Stinson Beach.

Although it appears that a year or two will be required for the waste discharge to the lagoon to be eliminated, it will ultimately be taken out of the lagoon. Shellfish, including commercial oysters, should be safe once again for public use.

WILDLIFE RESOURCES

Description of Environment

Bolinas Lagoon's shallow water environmental area provides a very selective habitat for water associated birds. The tidal flats support an abundance of wildlife. Among the important species is the black brant which is selective in its use of areas. Areas used by brant are considered as having exceptional values.

Species Present

Lists of birds present were recorded by the Marin Audubon Society between October, 1963, and January, 1966. (See Appendix I).

Black Brant Census Records by the Department of Fish and Game since 1961 are included in Appendix II.

Human Use

Presently, thousands of people use the wildlife resources through hunting, bird watching, aesthetic recreation and for educational training and study. Black brant and the egret rookery attract many people to the area.

With the additional influx of people to the Bay Area, more uses can be expected. It is expected that these additional people will seriously interfere with sport hunting. But at the same time, other uses of these natural resources will exceed this loss.

Public access will become more of a problem as various phases of private development occur unless every effort is made now to provide formally for access.

Over-all Importance of Area

Coastal wildlife habitat is at a premium. This water area is of international importance since large segments of the bird populations are migratory. Birds of Bolinas are also found in Mexico, Canada, and other foreign countries.

The Lagoon with its tidal flats and marsh areas provides necessary foods for residents and winter visitant birds. Many shorebirds are primarily dependent upon habitat of this nature for their existence. Reduction and loss of estuary habitat such as Bolinas Lagoon through dredging or filling will have a direct bearing on the population of these species.

Waterfowl, shorebirds, seabirds, and marshbirds have an inestimable esthetic value and are enjoyed annually by thousands of people.

Management Problems

Problems that will affect future management of wildlife resources fall into four categories:

Fill
Pollution
Dredging
Public Access

The encroachment of public use and development usually threatens filling in large segments of marsh and shallow water environments. These demands will make it difficult to preserve the estuarine habitats that are needed and so important for future maintenance and production of wildlife. The greatest dangers occur where shallow water areas are destroyed. These environments must be retained if we are to maintain the productive capacities of our bays and estuaries.

Public access to important water areas is continually being threatened by private interests and development around public waters. Unless plans are made now to preserve and retain these waters with public access, we can expect "Keep Out" and "No Trespassing" signs to circle the entire area.

SUMMARY

Bolinas Lagoon is a productive estuary richly endowed with fish and wildlife resources. These resources currently receive moderate use which will change to heavy use within a relatively short period (10-20 years). Increased human use of the area will be stimulated by its proximity to the Pt. Reyes National Seashore Area.

The Lagoon supports sizeable healthy populations of fish (including shellfish) and wildlife.

Certain human activities currently pose a threat to the future potential of the area. These are mainly related to deterioration of land and water habitat due to:

1. Water pollution - through discharge of inadequately treated wastes.

2. Dredging, filling of tidelands and indiscriminate shore developments.

Overexploitation of shellfish resources could result without adequate control.

Public use of these resources must also be safeguarded through provision for adequate access to water, tideland and shoreline areas.

RECOMMENDATIONS

To encourage the retention of these beneficial uses of Bolinas Lagoon, it is recommended that:

1. Planning efforts by Marin County Board of Supervisors, City of Bolinas, Department of Fish and Game, Bolinas Harbor District, Stinson Beach and major landowners be coordinated.

2. The existing Marin County master development plan be modified and updated. Recognition of all beneficial uses such as fish and wildlife and placing each in its proper perspective should be paramount.

3. Recreation, aesthetic considerations and fish and wildlife should be recognized as the major values of this Lagoon.

4. The aesthetic and biological integrity of the Lagoon be maintained by retention of all existing open water areas and the shoreline essentially in its present state, with the exception of the area in the eastern part of the Lagoon (See Appendix V) necessary for the establishment of the harbor facilities. Any filling essential to the establishment of harbor facilities should also be restricted to the area at the eastern corner of the Lagoon.

5. All tide and submerged lands, except those needed for harbor facilities, within the Lagoon be retained as open undeveloped areas. To insure this, all tide and submerged lands not required for the harbor facilities should be either acquired by public or private conservation interests or returned to State control.

6. In view of the major uses involved, public lands be managed by a resource or recreation agency such as the Department of Fish and Game or the Division of Beaches and Parks.

7. All dredging for the purpose of harbor development should be carried on in the southern end of the Lagoon as close to the sand spit as possible and within the confines of the area delineated in Appendix V.

8. All private lands between the Lagoon and State Highway #1 be acquired in public ownership to insure public access and use of the Lagoon.

9. No debris or refuse be deposited on any tidelands of the Lagoon.

10. The water quality of the Lagoon be maintained at a high standard so as to insure protection and public use of shellfish resources. Facilities should be developed to eliminate the discharge of sewage into the Lagoon.

11. Erosion control plans on the upland watershed be developed and implemented in order to minimize sediment discharge into the Lagoon.

12. All tide and submerged lands that are not necessary for the development of the harbor facilities be returned to State ownership and control.

APPENDIX I

BIRD LIFE OF BOLINAS LAGOON

List #1-Species of water-inhabiting birds observed on Bolinas Lagoon since October 1963:

Loon, Common
Loon, Arctic
Loon, Red-throated
Grebe, Red-necked
Grebe, Horned
Grebe, Eared
Grebe, Western
Grebe, Pied-billed
Pelican, White
Pelican, Brown
Cormorant, Double-crested
Cormorant, Brandt's
Cormorant, Pelagic
Heron, Great Blue
Heron, Green
Egret, Common
Egret, Snowy
Heron, Black-crowned night
Brant, Black
Mallard
Pintail
Teal, Green-winged
Widgeon, American
Shoverler
Redhead
Canvasback
Scaup, Greater
Scaup, Lesser
Goldeneye, Common
Goldeneye, Barrows
Bufflehead
Scoter, White-winged
Scoter, Surf
Ruddy Duck
Merganser, Common
Merganser, Red-breasted
Vulture, Turkey
Eagle, Bald
Osprey
Rail, Clapper
Coot
Plover, Semipalmated
Killdeer
Plover, Black-bellied
Rail, Virginia
Turnstone, Black
Snipe, Common
Curlew, Long-billed
Whimbrel
Sandpiper, Spotted
Willet
Yellowlegs, Greater
Yellowlegs, Lessor
Sandpiper, Pectoral
Sandpiper, Least
Dunlin
Dowitcher, Short-billed
Dowitcher, Long-billed
Sandpiper, Western
Godwit, Marbled
Sanderling
Phalarope, Red
Phalarope, Northern
Jaeger, Pomarine
Jaeger, Parasitic
Gull, Glaucous-winged
Gull, Western
Gull, Herring
Gull, California
Gull, Ring-billed
Gull, Mew
Gull, Bonaparte's
Gull, Heerman's
Kittiwake, Black-legged
Tern, Forster's
Tern, Royal
Tern, Elegant
Term, Caspian
Kingfisher, Belted
Phoebe, Black
Swallow, Violet-green
Swallow, Tree
Swallow, Rough-winged
Swallow, Barn
Swallow, Cliff
Yellowthroat
Blackbird, Redwinged
Sparrow, Song
Wren, Long-billed Marsh

List #2-Water birds not recorded since October 1963, but to be expected on the Lagoon:

Teal, Cinnamon
Scoter, Common
Sora
Rail, Black
Turnstone, Ruddy
Sandpiper, Baird's
Phalarope, Wilson's
Owl, Short-eared

List #3-Land birds that have been observed within 100 feet of the high tide line of Bolinas Lagoon:

Hawk, Sharp-shinned
Hawk, Cooper's
Hawk, Red-tailed
Hawk, Red-shouldered
Eagle, Golden
Hawk, Sparrow
Quail, California
Dove, Mourning
Owl, Barn
Owl, Great Horned
Hummingbird, Black-chinned
Hummingbird, Anna's
Hummingbird, Allen's
Flicker, Red-shafted
Woodpecker, Acorn
Woodpecker, Hairy
Woodpecker, Downy
Phoebe, Say's
Flycatcher, Western
Jay, Steller's
Jay, Scrub
Raven, Common
Crow, Common
Chickadee, Chestnut-backed
Bush-tit, Common
Creeper, Brown
Wrentit
Wren, Winter
Wren, Bewick's
Robin
Hermit Thrush
Kinglet, Ruby-crowned
Waxwing, Cedar
Shrike, Loggerhead
Starling
Vireo, Hutton's
Warbler, Yellow
Warbler, Myrtle
Warbler, Audubon's
Warbler, Wilson's
Sparrow, House
Meadowlark, Western
Oriole, Bullock's
Blackbird, Brewer's
Cowbird, Brown-headed
Grosbeak, Black-headed
Finch, Purple
Finch, House
Goldfinch, American
Goldfinch, Lesser
Towhee, Bufous-sided
Towhee, Brown
Junco, Oregon
Sparrow, White-crowned
Sparrow, Golden-crowned
Sparrow, Fox
Sparrow, Lincoln's

List #4- Species that formerly nested on Bolinas sand spit:

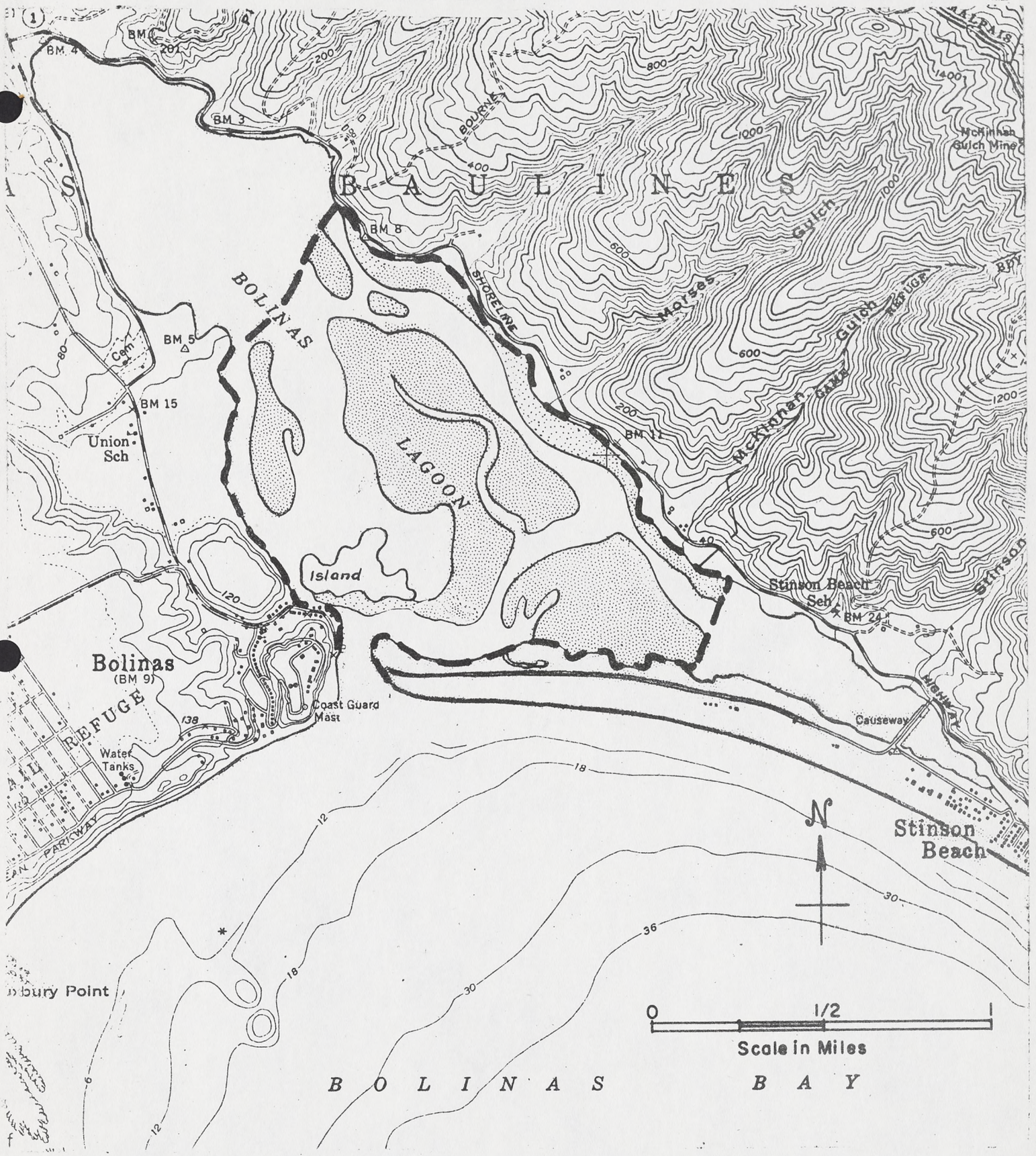
Plover, Snowy
Term, Least

APPENDIX II

BLACK BRANT CENSUS ON BOLINAS LAGOON

Year	February		April		May		June	
	Date	Total	Date	Total	Date	Total	Date	Total
1961	14	150	5	28	4	54	2	0
1962	19	6	9	31	4	4	4	0
1963	25	250	19	475	6	213	4 21	204 115
1964	24	600	10	387	8	2	5 22	77 9
1965	24	181	12	750	10	0	7	35

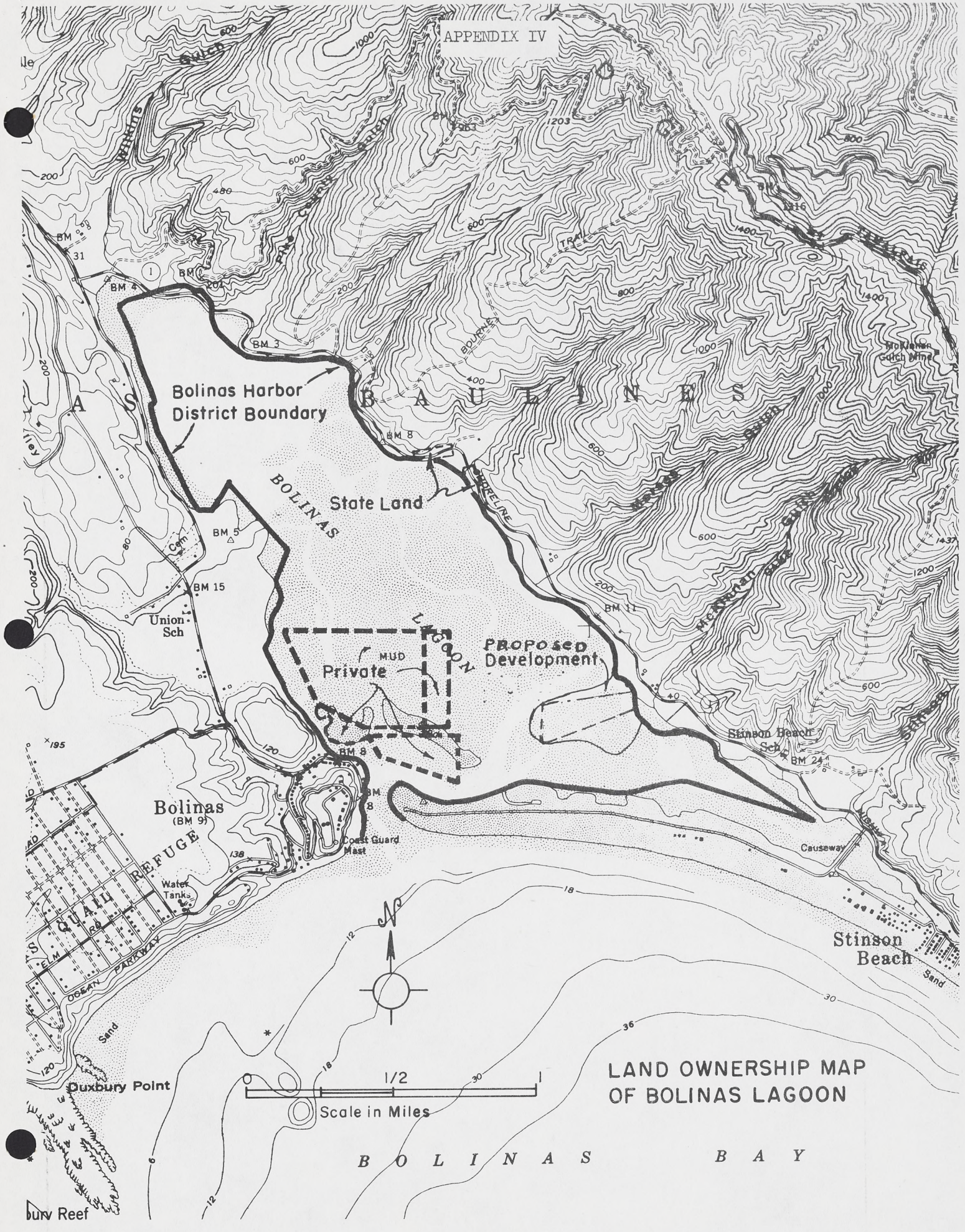
APPENDIX III



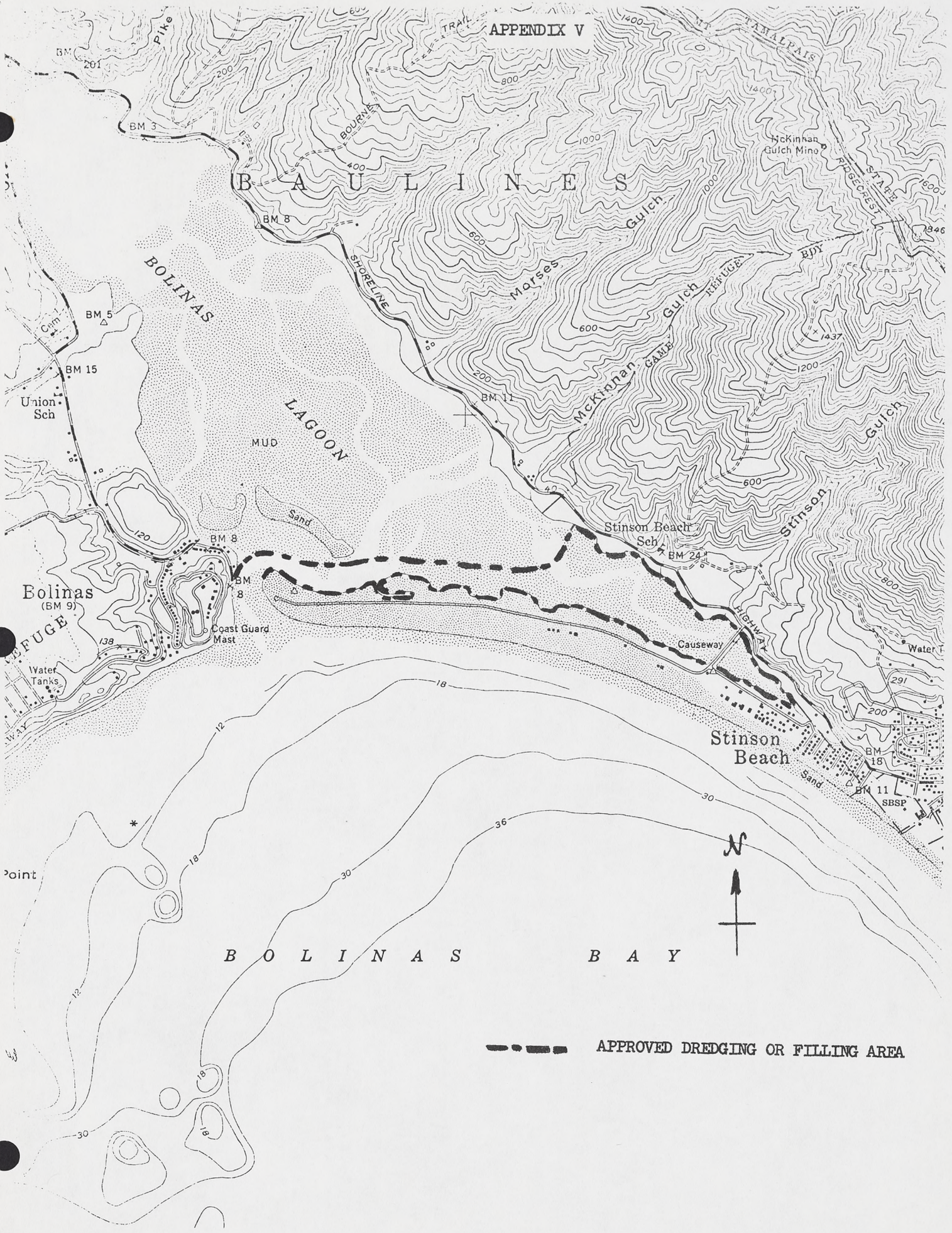
SHELLFISH AREAS OF BOLINAS LAGOON

— — — Boundary of Shellfish Habitat

Shellfish harvesting areas


APPENDIX IV
Bolinas Harbor District Boundary
State Land
PROPOSED Development
Private
MUD
LAGOON
Bolinas
(BM 9)
REFUGE
Union Sch
Stinson Beach Sch
Stinson Beach
Coast Guard Mast
Water Tanks
Causeway
Duxbury Point
Duxbury Reef
Scale in Miles
1/2
LAND OWNERSHIP MAP
OF BOLINAS LAGOON
BOLINAS BAY

APPENDIX V


BOLINAS
LAGOON
MUD
Sand
Bolinas
(BM 9)
Coast Guard
Mast
Water
Tanks
Union
Sch
Cem
BM 15
BM 5
BM 8
BM 3
Pike
TRAIL
BOURNE
SHORELINE
Marses
Gulch
McKinnan
Gulch
GAME
REFUGE
McKinnan
Gulch Mine
RIDGECREST
STATE
Stinson
Gulch
Stinson Beach
Sch
BM 24
BM 11
BM 18
SBSP
Causeway
HIGHWAY
Water T
Stinson
Beach
Point
BOLINAS BAY
N
APPROVED DREDGING OR FILLING AREA